

Deciphering the Interplay of Psychological Traits and Learning in the Workplace: A Hybrid SEM-fsQCA Analysis

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Abstract

In today's knowledge-centric economy, workplace learning (WPL) has emerged as a critical determinant for individual and organisational success, necessitating deeper investigations into its antecedents. Utilizing a sample of 546 Vietnamese retail employees, this study employs a hybrid SEM-fsQCA methodology to investigate a novel model of both direct and mediated influences of growth mindset, occupational self-efficacy, and mastery goal orientation on WPL. The research illuminates the pivotal roles of these positive psychological attributes in fostering learning endeavours to develop competencies, particularly underscoring the notable impact of informal WPL. While SEM analysis uncovers sequential mediation pathways constituting a mindset meaning system facilitating WPL and competency enhancement, fsQCA reveals a spectrum of psychological and behavioural combinations conducive to optimal learning outcomes. Besides enriching the WPL knowledge base and extending education-originated psychological theories into business context, this study provides actionable insights for organisations to refine their training and development paradigms, ultimately amplifying workforce proficiency.

Track: Organisational Psychology

1. Introduction

The knowledge-based economy of today places a premium on continuous workplace learning ("WPL") due to the rapid obsolescence of skills amidst technological and market changes (Kopp et al., 2020, Noe et al., 2014). The shelf life of professional competencies is decreasing, underscoring the limitations of traditional education in keeping up with current workforce demands (Larsen et al., 2017). Moreover, WPL is now fundamental not only for individual career advancement but also for organisational competitiveness and sustainability (Shang and Wu, 2019). WPL entails acquiring and refining competencies through both formal training (via courses, seminars, workshops, etc.) and informal on-the-job learning like observation, reflection, and information-seeking, etc. (Matthews, 1999). Such competencies, which can be materialised as knowledge, skills, abilities, or other characteristics, or "KSAOs" (Kraiger et al., 1993, Gagne, 1984), are crucial organisational assets that bolster performance and adaptability (Subramony et al., 2018, Lu et al., 2015). Such notable benefits have led to accelerating investment in learning within the business space (Shang and Wu, 2019). However, despite the increasing learning budgets, the actual uptake of WPL initiatives often falls short of expectations or requirements (Carlisle et al., 2019), and the linkage between learning opportunities and actual engagement is complex, especially in the realm of self-driven informal learning (Kyndt and Baert, 2013, Decius et al., 2019), highlighting a need for more research into the factors that drive WPL engagement (Park and Lee, 2018).

Among the critical predictors of WPL engagement, personal characteristics such as psychological traits have earned significant attention in both academic and business fields (Kyndt and Baert, 2013). Over the past few decades, several positive psychological attributes like growth mindset, self-efficacy, and mastery goal orientation have emerged as crucial determinants of success in school and life (Heckman and Kautz, 2014). Growth mindset refers to one's beliefs about the expandability of one's abilities through effort (Dweck, 2006), self-efficacy pertains to the self-perception of one's capability to successfully achieve goals (Bandura, 1997), and mastery goal orientation means one's inclination towards competence enhancement, especially instead of performance demonstration (Vandewalle and Cummings, 1997). These traits have been shown to facilitate learning (Honicke and Broadbent, 2016, Kamtsios and Karagiannopoulou, 2013), yet previous research predominantly focuses on academic settings (Barber et al., 2019), with limited application to workplace learning despite its significance (Han and Stieha, 2020). Remarkably, notwithstanding several theoretical connections, research into the potential linkages between growth mindset and WPL remains uncharted, highlighting a research gap. Moreover, as suggested by Rigotti (2009), the relationships between psychological traits and work outcomes are often complex and non-linear, warranting explorations of both direct and indirect influences they might exert on WPL.

This study addresses these gaps by examining a framework wherein growth mindset influences WPL directly and indirectly through self-efficacy and mastery goal orientation. The framework integrates theories from various domains, including implicit self-theory (Diener and Dweck, 1978), social cognitive theory (Bandura, 1986), and goal orientation theory (Dweck and Leggett, 1988), enriched by Yeager and Dweck (2020)'s mindset meaning system and Tynjälä (2013)'s 3-P model of WPL. We aim to elucidate the psychological pathways that manifest mindsets and associated psychological traits into actionable WPL behaviours and outcomes. These findings can guide organisations' human capital enhancement strategies and endorse a

lifelong learning culture. In achieving these research objectives, we set out to address the following research question:

How do psychological attributes like growth mindset, occupational self-efficacy, and mastery goal orientation influence workplace learning behaviours and outcomes, and through what mechanisms?

Especially, by employing both symmetric modelling (SEM) and asymmetric configurational analysis (fsQCA) on a sample of 546 retail employees in Vietnam, this study transcends conventional methodologies to advance a more comprehensive and nuanced exploration of the above research question, offering an intricate understanding of the psychological dynamics at play in the WPL realm. This methodological pluralism enhances the study's robustness and the validity of our findings, enriching both the academic and managerial discourses in organisational psychology and human resource development.

Subsequent sections of this paper include a literature review and hypotheses development (Section 2), methodology (Section 3), findings (Section 4), and a discussion that integrates research implications, limitations, and future research directions (Section 5), followed by a conclusion (Section 6).

2. Literature review

2.1. Theoretical review and related works

2.1.1. Workplace learning

Prevailing research on WPL can be situated within the framework of Tynjälä (2013)'s 3-P WPL model, which delineates three pivotal components: Presage (i.e., learner-specific and contextual determinants), Process (i.e., the actual enactment of WPL), and Product (i.e., the resultant learning outcomes) (Park and Lee, 2018). Tynjälä (2013)'s Presage component has been the focal point of extensive exploration, with its antecedents systematically classified across three tiers of influence: the micro (individual and job-related attributes), the meso (learning activities), and the macro-organisational stratum. Within these categories, personal attributes have been underscored as significant precursors to WPL (Kyndt and Baert, 2013).

A significant proportion of these personal attributes are psychological in nature. Notably, while the growth mindset is a widely acknowledged psychological trait in student learning contexts, its role as a predictor of WPL remains under-researched within workplace settings (Han and Stieha, 2020, Park et al., 2020a). An earlier investigation by Maurer et al. (2002) examines WPL through the implicit theories held by workers, which bear ontological affinity to mindset theory (Burnette et al., 2013). Nonetheless, their study is circumscribed to managerial engagement with WPL following 360-degree feedback, thus narrowing the scope of these conceptual understandings. More contemporary scholars such as Lyons and Bandura (2018, 2020) and Pearson (2020) have probed into the correlations between mindsets, self-regulated learning, and the learning orientation of employees, as influenced by individual learning styles and the role of the manager-as-coach. Nevertheless, without empirical substantiation, these explorations remain largely theoretical and focus on attributes that, while related to WPL, do not represent the whole concept, leaving lacunae for empirical research such as the present study to fill.

2.1.2. *Growth mindset*

The theory of growth and fixed mindsets finds its genesis in the foundational framework of implicit self-theory, which encapsulates an individual's core beliefs about the malleability of their inherent abilities and traits (Diener and Dweck, 1978). At the heart of this theory lies the notion that individuals with a growth mindset perceive their intelligence, skills, and talents as amenable to enhancement through education, persevering effort, and persistence. In contrast, those harbouring a fixed mindset view such personal attributes as static and unchangeable (Dweck and Leggett, 1988).

Mindset research has predominantly targeted students, linking a growth mindset to improved academic outcomes (Gunderson et al., 2018). However, researchers such as Bazelaïs et al. (2018) and Li and Bates (2019, 2020) have presented less conclusive evidence, pointing to the need for further study (Han and Stieha, 2020).

Beyond academic contexts, the relevance of growth mindset in Human Resource Development ("HRD") has also been the subject of recent scholarly attention (Han and Stieha, 2020). Positive impacts noted include enhanced individual job performance (Cutumisu et al., 2018), better team relations (Shapcott and Carr, 2020), and increased organisational citizenship (Özdoğan and Tanova, 2017). However, as Han and Stieha (2020) accentuated, the intricate dynamics between growth mindset and HRD still warrant further exploration to bridge existing knowledge gaps.

2.1.3. *Self-efficacy and Mastery goal orientation*

Fundamentally, implicit self-theory is closely linked with Bandura (1986)'s social cognitive theory and the achievement goal theory by Elliott and Dweck (1988), which delineate how mindsets influence self-perceptions of ability and the achievement goals that individuals pursue, affecting their responses to adversity (Elliott and Dweck, 1988, Weiner, 1985).

Self-efficacy is a cornerstone of Bandura (1986)'s social cognitive theory, described as the belief in one's ability to marshal internal resources (e.g., skills, resilience) to achieve goals and complete tasks (Stirin et al., 2012). Initially studied within education, the role of self-efficacy in workplace settings has garnered attention, with evidence linking it to several organisational outcomes, such as employee performance (Judge and Bono, 2001), innovation (Newman et al., 2018), leadership (Taggar and Seijts, 2003), and simulated organisational achievements (Wood and Bandura, 1989).

On another front, Dweck and Leggett (1988)'s goal orientation theory discusses two primary goal orientations: performance and learning. Individuals oriented towards performance goals mainly seek positive performance evaluations from others, thus often exhibiting helpless responses, shying away from challenges and attributing failures to an inherent lack of ability. Conversely, those with a learning goal orientation are primarily motivated by capability enhancement and, hence, are likely to adopt mastery-oriented responses, embracing challenges, viewing failure as informative, and demonstrating resilience under stress (Diener and Dweck, 1978, Diener and Dweck, 1980, Nicholls, 1984).

The interplay between growth mindset, self-efficacy, and mastery goal orientation has led to the conceptualisation of the "mindset meaning system" ("MMS") (Yeager and Dweck, 2020),

which encompasses the interaction of goals, effort beliefs, and attributions. While researchers like Miele and Molden (2010), Burnette et al. (2013), and Yeager et al. (2019) support the MMS, others question its empirical strength (Burgoyne et al., 2020), prompting a call for further research into the meaning system hypotheses to advance the field towards reconciliation. The following section will provide an in-depth exploration of our hypotheses under examination.

2.2. Hypotheses development

2.2.1. Direct influence of growth mindset on WPL participation

Among the features associated with mindsets, four bear particular relevance and significance within the HDR context, i.e., goal orientation, self-efficacy, reflection, and feedback processing (Han and Stieha, 2020). These characteristics also serve as conceptual bridges linking growth mindset with WPL. First, the link between growth mindset and mastery goal orientation ("MGO") has long been established (Dweck and Reppucci, 1973), while Ong (2014) confirms the positive correlation between MGO and adults' persistence in learning, which significantly aligns with the concept of WPL. Second, Bandura (1997)'s proposition that a growth mindset entails one's belief in one's self-efficacy has garnered empirical validation in the corporate context (Tabernero and Wood, 1999), while studies have indicated that employees' self-efficacy stands as one of the most influential determinants of WPL participation (Maurer et al., 2003). Third, reflection, defined as the process of analysing and learning from past experiences and setbacks, is a core aspect of the growth mindset (Hüther, 2016), while scholars like Zimmerman and Campillo (2003) and Park and Lee (2018) have long advocated for the association between reflection and learning. Lastly, while the implicit self-theory posits that an individual's mindset shapes their assessment of the perceived costs and benefits of seeking feedback (Vancouver and Morrison, 1995), several researchers have established connections between feedback and both formal WPL (Garavan et al., 2010) and informal WPL (Doornbos et al., 2008). In light of these connections, the following hypothesis is proposed:

Hypothesis 1. Growth mindset positively influences a) formal and b) informal WPL participation.

2.2.2. The roles of Self-efficacy

Bandura (1997) suggests that a growth mindset fosters self-efficacy, the belief in one's intellectual growth and ability to overcome challenges. This link is evident across various demographics, including schoolchildren (Su et al., 2021), university students (Samuel and Warner, 2019), and professionals (Tabernero and Wood, 1999). However, Chen et al. (2001) contend that domain's specificity matching is essential when assessing self-efficacy with specific behavioural outcomes. To ensure domain-specificity comparability in this study's business setting, we consider occupational self-efficacy ("OSE") to align self-efficacy with workplace behaviours. Research directly connecting growth mindset with OSE remains limited, leading us to hypothesize that:

Hypothesis 2. Growth mindset positively influences occupational self-efficacy.

On the other hand, self-efficacy underpins effective learning by promoting attitudes and behaviours conducive to learning success (Zimmerman, 2000, Alhadabi and Karpinski, 2019). It is also associated with self-regulated learning strategies (Honicke and Broadbent, 2016, Russell and Warner, 2017). Therefore, we propose that:

Hypothesis 3. Occupational self-efficacy positively influences a) formal and b) informal WPL participation.

Given the above, it is plausible to consider self-efficacy as a mediator between growth mindset and WPL. While self-efficacy's mediating role has been examined in various organisational studies (Ren and Chadee, 2017), its specific function in the growth mindset-WPL relationship is unexplored. Thus, we hypothesise:

Hypothesis 4. Occupational self-efficacy mediates the positive relationship between growth mindset and a) formal and b) informal WPL participation.

2.2.3. The roles of mastery goal orientation

Dweck and Leggett (1988) traced their goal orientations back to Diener and Dweck (1978)'s implicit theories of individuals, suggesting that those who view intelligence as fixed tend to adopt a performance-goal orientation, striving to demonstrate their capabilities, whereas individuals viewing intelligence as malleable favour a mastery or learning-goal approach, aiming to enhance their abilities. This association has been supported by studies such as Puente-Díaz and Cavazos-Arroyo (2017) and Zhao et al. (2021), leading to:

Hypothesis 5. Growth mindset positively influences mastery goal orientation.

While originating in educational contexts, mastery goal orientation has been increasingly associated with various organisational outcomes, such as adult learning (Ong, 2014), feedback-seeking (Vandewalle and Cummings, 1997), and training engagement (Brett and Vandewalle, 1999). Payne et al. (2007) also found that a mastery goal orientation correlates with better learning results. Reflecting the evidence of the relationship between mastery goal orientation, growth mindset, and learning (Pajares et al., 2000, Hsieh et al., 2007, Payne et al., 2007), the following hypotheses are proposed:

Hypothesis 6. Mastery goal orientation positively influences a) formal and b) informal WPL participation.

Hypothesis 7. Mastery goal orientation mediates the positive relationship between growth mindset and a) formal and b) informal WPL participation.

2.2.4. Occupational self-efficacy – Mastery goal orientation sequential mediation effect

Previous literature endorses a link between self-efficacy and MGO (Vandewalle, 2003). Schnell et al. (2015) showed that students with strong self-efficacy are inclined to pursue mastery goals, select challenging tasks, and perform better academically. Further research by Honicke and Broadbent (2016) and Alhadabi and Karpinski (2019) has reinforced the direct influence of self-efficacy on MGO, leading to the next hypothesis:

Hypothesis 8. Occupational self-efficacy positively influences mastery goal orientation.

This study identified OSE and MGO as two potential mediators in the growth mindset - WPL nexus. According to Hayes (2017), parallel mediation involves a weak or non-existent link between the mediators, while sequential mediation entails a strong correlation between them. With H8 suggesting a robust connection between OSE and MGO, we propose the following sequential mediation:

Hypothesis 9. Occupational self-efficacy and mastery goal orientation have a sequential mediating effect on the positive relationship between growth mindset and a) formal and b) informal WPL participation.

2.2.5. The effects on WPL outcomes

The body of research on the outcomes of workplace learning (WPL) is somewhat disparate (Noe et al., 2014), yet among the more influential conceptual frameworks is that proposed by Carlson (1993), which posits that cognitive learning processes lead to internal changes within the brain's structure and biochemistry. Given the right conditions, these changes can manifest as behavioural, cognitive, or affective transformations, which often materialise as newly acquired competencies. The acquisition of these competencies, often encapsulated in the term "KSAOs" – knowledge, skills, abilities, and other characteristics, symbolises the enhancement of an individual's performance capabilities (Kraiger et al., 1993, Weinert, 2001). In this study, we define WPL outcomes as vocationally pertinent KSAOs that employees gain through recent learning experiences in the workplace, equipping them to fulfil their job responsibilities. Consequently, learning that occurs within the workplace context, whether through formal or informal means, is anticipated to contribute to the development of employees' competencies or KSAOs (Wielenga-Meijer et al., 2010), leading to:

Hypothesis 10. (a) Formal and (b) Informal WPL positively influences employees' KSAOs.

KSAOs are regarded as tangible indicators distinguishing high-performing individuals within an organisation (Kochanski, 1996). Empirical research supports that individuals with a growth mindset exhibit enhanced task performance (Cutumisu et al., 2018) and increased productivity (Keating and Heslin, 2015). This association is underpinned by implicit self-theory, which posits that individuals with a growth mindset are likely to exhibit greater motivation, engagement, and resilience, all conducive to superior performance outcomes (Diener and Dweck, 1978). It is thus hypothesised that a growth mindset could be correlated with a more effective acquisition of competencies, or KSAOs.

Hypothesis 11. Growth mindset positively influences employees' KSAOs.

Considering hypotheses 9, 10, and 11, we can conjecture that OSE, MGO, and formal/informal WPL participation may act as sequential mediators in the relationship between an individual's growth mindset and their acquisition of KSAOs. These sequential mediations are congruent with the input-process-output framework within the domain of individual learning, which suggests that an input initiates a learning process that subsequently results in a learning output (Decius et al., 2021).

Hypothesis 12. Occupational self-efficacy, mastery goal orientation, and a) formal and b) informal WPL participation have a sequential mediating effect on the positive relationship between growth mindset and KSAOs.

Altogether, the above hypotheses lead to the following conceptual model:

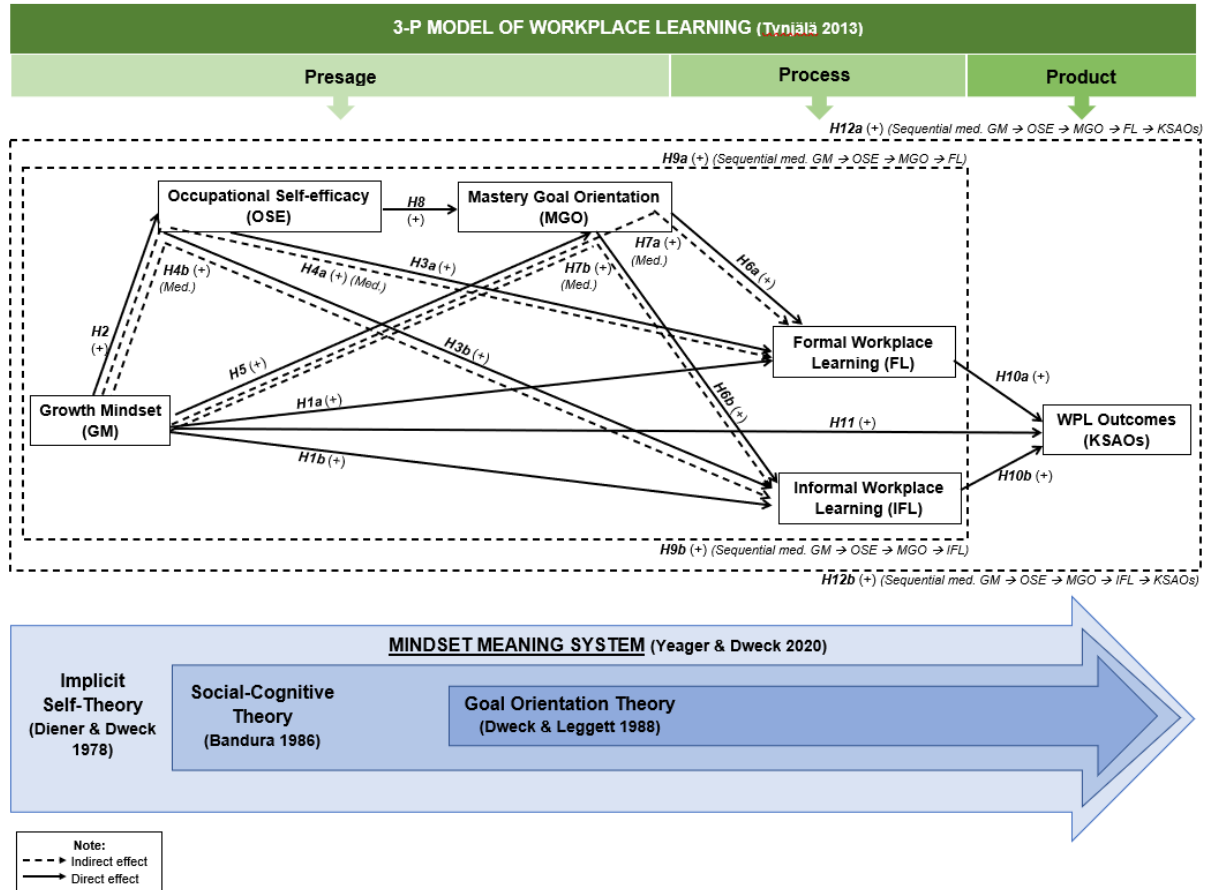


Figure 1. The study's Conceptual Framework

In summary, this study's conceptual framework encompasses all three components of Tynjälä (2013)'s 3-P WPL model, where the psychological factors represent the Presage, formal and informal WPL form the Process, and KSAOs serve as the Product of WPL. These components are bound together via the integration of implicit self-theory (Diener and Dweck, 1978), social cognitive theory (Bandura, 1986), and goal orientation theory (Dweck and Leggett, 1988), which advances an expansion of the mindset meaning system framework (Yeager and Dweck, 2020).

3. Methodology

Our study employs a mixed-method approach, integrating structural equation modelling (SEM) and fuzzy-set qualitative comparative analysis (fsQCA) to rigorously test our conceptual model in a manner more robust than the traditional methods. SEM is adept at quantifying intricate variable relationships and validating hypotheses through statistical analysis of direct and indirect effects (Kline, 2023). However, it may overlook complex interactions among variables. Complementing SEM, fsQCA offers insight into the combined effects of conditions that SEM might miss. It uses fuzzy set theory and Boolean algebra to reveal causation patterns (Fiss, 2011), a dimension seldom explored by previous studies. Together, SEM and fsQCA provide a more adequate theory construction and testing and a more comprehensive and nuanced exploration of the research question (Woodside, 2014).

3.1. Data collection

With ethical approval secured, an online anonymous survey was administered from October to November 2022, targeting Vietnam's retail sector employees, yielding 870 total responses. The retail sector's vital role in economic growth and its reliance on intellectual and human capital for performance (Nguyen et al., 2020, Le, 2020) make it a fitting context for this WPL study. Employees in this sector face constant learning demands due to regulatory, technological, and market shifts (Nguyen, 2021), underscoring the value and relevance of our research framework.

We designed the survey to capture data from skilled, full-time employees over 18 with at least a year's tenure. Post-screening for criteria adherence, incomplete data, and signs of disengaged responding such as speeding and straight-lining, 546 valid responses were retained for analysis.

Table 1 offers a demographic snapshot of our sample. Females represented 57.0 percent, and males 41.4 percent, aligning with the retail sector's employment patterns (Amin and Islam, 2014). Millennials (i.e., 26-41 years old) made up 86.2 percent of respondents, followed by Gen X (i.e., 42-57 years old) at 11 percent, and Gen Z (<25 years old) at 2.7 percent. The sample mainly consisted of subordinate employees (41.1 percent), team leaders (32.2 percent), middle managers (25.6 percent), and a small fraction of executives/directors (0.7 percent). Lastly, most participants held a bachelor's degree (68.9 percent) or a college diploma (22.3 percent).

Age	N (%)	Position	N (%)
18 – 25	15 (2.7)	Executive/Director	4 (0.7)
26 – 33	254 (46.5)	Middle manager	140 (25.6)
34 – 41	217 (39.7)	Team leader	176 (32.2)
42 – 57	60 (11.0)	Officer/ specialist/ staff	226 (41.4)
Gender	N (%)	Education	N (%)
Male	226 (41.4)	Doctorate degree	5 (0.9)
Female	311 (57.0)	Master's degree	36 (6.6)
Other	9 (1.6)	Bachelor's degree	335 (61.4)
		College diploma	122 (22.3)
Location	N (%)	Vocational Certificate	11 (2.0)
North Vietnam	53 (9.7)	High School Diplomas	36 (6.6)
Central Vietnam	66 (12.1)	Did not complete High School	1 (0.2)
South Vietnam	427 (78.2)		

Table 1. Demographics of the sample

3.2. Measurements

Growth mindset was measured by Dweck (1999)'s "Theories of Intelligence Scale – Self Form for Adults". Items included statements like "I can always substantially change how intelligent I am," rated on a six-point Likert scale ranging from 1 – "strongly disagree" to 6 – "strongly agree."

Occupational self-efficacy was captured by the eight-item version of the OCCSEFF scale (Schyns and Von Collani, 2002). This scale comprises statements such as "Thanks to my resourcefulness, I know how to handle unforeseen situations in my job," with ratings from 1 – "completely true" to 6 – "not at all true."

Mastery goal orientation was assessed using Baranik et al. (2007)'s Goal Orientation scale in the work domain. Items include statements such as "I am willing to select a challenging work assignment that I can learn a lot from," which were rated from 1 – "not at all true of me" to 7 – "very true of me."

Formal and informal WPL participation was measured by two corresponding sets of items drawn from the 13-item scale validated by Grosemans et al. (2020). Participants indicated their frequency of engagement with formal (e.g., "Took part in a workshop") and informal WPL (e.g., "Asked the opinion of others on what I did") over the past six months on a scale from 1 – "never" to 7 – "on a daily basis."

Newly acquired KSAOs were measured by the KSAOs scale developed by Taverniers (2011) and validated by Nikolova et al. (2014). This scale delves into recently obtained work competencies by asking if, "in the past six months," the respondents "have obtained new competencies, which help [them] function better at [their] work," etc., to which they answered from 1 – "strongly disagree" to 5 – "strongly agree."

Following Beaton et al. (2000)'s rigorous guidelines for cross-cultural adaptation, the original measurement scales were translated from English to Vietnamese so that all local respondents could fully comprehend the survey questions and give their most valid responses.

4. Findings

4.1. Structural equation modelling (SEM)

Using the AMOS software, we performed a covariance-based SEM analysis comprising confirmatory factor analysis, common method bias treatment, and path analysis.

4.1.1. Confirmatory factor analysis (CFA)

The model's initial CFA revealed a generally acceptable fit, indicated by the CFI (0.863), RMSEA (0.071), and PClose (0.000) values that were close to but did not fully meet the recommended thresholds of 0.95, 0.06, and 0.05 respectively (Hu and Bentler, 1999). To enhance model fit, seven items were removed following the guidance of modification indices, leading to a modified CFA model with excellent goodness-of-fit indicators, as shown in Table 3.

	MSV	AVE	CR	Coef. H	Cronbach's alpha	GM	OSE	MGO	FL	KSAOs	IFL
GM	0.182	0.558	0.834	0.81	0.83	0.747					
OSE	0.246	0.568	0.887	0.90	0.91	0.427***	0.754				
MGO	0.246	0.556	0.830	0.79	0.82	0.366***	0.496***	0.745			
FL	0.155	0.515	0.807	0.80	0.81	0.163**	0.270***	0.263***	0.717		
KSAOs	0.118	0.712	0.880	0.90	0.91	0.168***	0.259***	0.315***	0.225***	0.844	
IFL	0.155	0.534	0.851	0.91	0.88	0.250***	0.332***	0.376***	0.394***	0.344***	0.731
Thresholds (Henseler et al., 2015)	<AVE	>0.5	>0.7	>0.7	>0.7						

Notes: MSV = Maximum Shared Variance, AVE = Average Variance Extracted, CR = Composite Reliability, Coef. H = Coefficient H, GM = Growth Mindset, OSE = Occupational self-efficacy, MGO = Mastery Goal Orientation, FL = Formal Learning, IFL = Informal learning, and KSAOs = Knowledge, skills, abilities, and other characteristics.

Table 2. Validity and reliability test results

Table 2 illustrates that the modified CFA model has adequate discriminant and convergent validity, with all indices surpassing the minimal recommended values. Construct reliability was confirmed through Composite Reliability (CR), Coefficient H, and Cronbach's alpha, all of which significantly exceeded the 0.7 threshold, denoting good reliability.

4.1.2. Common method bias (CMB)

Given the potential for CMB in behavioural research, our study incorporated several preventative measures, including varied response scales, randomised question order, and assurances of confidentiality (Podsakoff et al., 2003, Mackenzie and Podsakoff, 2012). Face validity was ascertained through expert consultations with senior researchers in the field and professionals from different retail organisations.

Crucially, we also addressed CMB with statistical analyses and control. Even though Harman's single-factor test suggested CMB was not an issue, with a total variance extracted of 23.9 percent below the 50 percent threshold (Cooper et al., 2020), we followed the more stringent specific bias test, which involved incorporating D'arcy et al. (2014)' social desirability scale into the survey. The test revealed that the specific bias linked to social desirability was present and unevenly distributed in our study, as indicated by Appendix A. To account for this, social desirability was maintained as a control variable in the model for subsequent analyses.

4.1.3. Path analysis

The last step in our SEM analysis was to perform path analysis to test the hypotheses in our conceptual model. Table 3 below summarises the key model fit indicators for the three models discussed thus far, including the final SEM model. After controlling for social desirability and demographic factors such as age, gender, and educational qualifications, the SEM model achieved excellent model fit, supporting the validity of the results.

Measure of fit	Initial CFA model	Modified CFA model	SEM model	Thresholds (Hu and Bentler, 1999)
CMIN/DF	3.773	2.038	2.128	Between 1 and 3
CFI	0.863	0.955	0.931	>0.95
SRMR	0.053	0.042	0.056	<0.08
RMSEA	0.071	0.044	0.045	<0.06
PClose	0.000	0.981	0.966	>0.05

Table 3. Measure of fit statistics of CFA and SEM models

Our SEM model supported all hypotheses except H1a, H1b, and H11. In terms of direct effects, growth mindset shows statistically significant and positive effects on both OSE ($\beta=0.333$; $p<0.001$) and MGO ($\beta=0.180$; $p<0.001$), supporting H2 and H5, respectively. OSE is found to positively impact both formal ($\beta=0.184$; $p=0.005$) and informal learning ($\beta=0.144$; $p=.017$), as well as MGO ($\beta=0.383$; $p<0.001$), supporting H3a, 3b, and H8. Similarly, MGO also shows a positive influence on both formal ($\beta=0.189$; $p=0.002$) and informal learning ($\beta=0.273$; $p<0.001$), supporting H6a and H6b. Finally, while both forms of formal ($\beta=0.118$; $p=0.016$) and informal learning ($\beta=0.269$; $p<0.001$) show a positive impact on learning outcomes in the form of improved KSAOs, hence supporting H10a and H10b, it is noteworthy that the effect of informal learning on KSAOs is more than double that of formal learning. On the other hand,

growth mindset does not show a statistically significant direct effect on formal ($p=0.871$) and informal learning ($p=0.313$), as well as KSAOs ($p=0.192$), rendering H1a, H1b, and H11 the three unsupported hypotheses in our model.

The squared multiple correlations (R^2) show that growth mindset accounts for approximately 33 percent of OSE's variance, while both together explain about 30 percent of the variance in MGO. All three psychological attributes together explain about 13 percent of formal learning and 21 percent of informal learning. Lastly, both forms of learning account for about 16 percent of learning outcomes, i.e., improved KSAOs. These R^2 values are considered satisfactory within social science research, such as the present one (Ozili, 2023).

Regarding indirect effects, all proposed mediation hypotheses in the SEM model are supported. Both OSE and MGO mediate the relationships between growth mindset and formal as well as informal learning, supporting H4a ($\beta=0.061$; $p=0.01$), H4b ($\beta=0.048$; $p=0.025$) and H7a ($\beta=0.034$; $p=0.002$), H7b ($\beta=0.049$; $p=0.001$). Moreover, all sequential mediation effects are also statistically significant, supporting H9a ($\beta=0.127$; $p<0.001$), H9b ($\beta=0.127$; $p<0.001$), H12a ($\beta=0.127$; $p=0.003$) and H12b ($\beta=0.127$; $p<0.001$). These findings suggest that the influence of growth mindset on WPL participation is fully mediated by OSE and MGO, both individually and sequentially. Similarly, the relationship between growth mindset and KSAOs is also fully mediated by OSE, MGO, and either form of WPL. Figure 2 summarises the results of our SEM analysis.

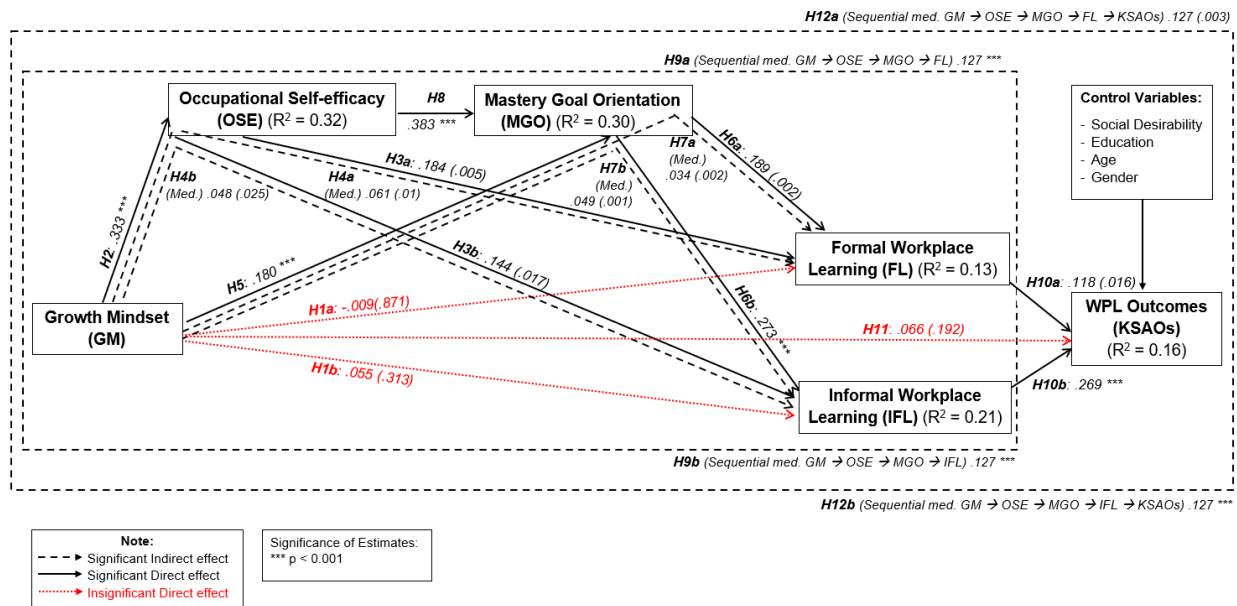


Figure 2. SEM results

4.2. Fuzzy-set qualitative comparative analysis (fsQCA)

To investigate the study's conceptual framework from a configurational perspective, we followed Pappas and Woodside (2021)'s recommended steps for performing fsQCA using the fsQCA 3.0 software developed by Ragin and Davey (2016).

4.2.1. Contrarian case analysis

The initial step of our fsQCA entailed the identification of contrarian cases through quintile cross-tabulation. This process enabled the recognition of cases where relationships among variables contrasted with the anticipated main effects (Pappas and Woodside, 2021). For example, the 5x5 matrix in Table 4 reveals scenarios where a lower level of OSE was associated with enhanced KSAOs and cases where a higher level of OSE did not correspond with improved KSAOs. Such findings indicate the existence of complex configurations that also lead to positive learning outcomes but are overlooked by traditional variance-based analyses. These contrarian cases, as detailed in Appendix B, justify the deployment of fsQCA to capture the multifaceted interactions among constructs that contribute to learning outcomes.

Positive contrarian cases:
OSE → ~KSAOs

Large main effect:
OSE → KSAOs

Negative contrarian cases:
~OSE → KSAOs

Percentile Group of OSE * KSAOs Crosstabulation

			Percentile Group of KSAOs					Total
			1	2	3	4	5	
Percentile Group of Growth Mindset (GM)	1	Count	41	15	29	2	11	98
		% of Total	7.5%	2.7%	5.3%	0.4%	2.0%	17.9%
	2	Count	24	18	48	4	17	111
		% of Total	4.4%	3.3%	8.8%	0.7%	3.1%	20.3%
	3	Count	28	5	53	7	12	105
		% of Total	5.1%	0.9%	9.7%	1.3%	2.2%	19.2%
	4	Count	21	14	57	5	18	115
		% of Total	3.8%	2.6%	10.4%	0.9%	3.3%	21.1%
	5	Count	12	4	34	7	60	117
		% of Total	2.2%	0.7%	6.2%	1.3%	11.0%	21.4%
Total	Count	126	56	221	25	118	546	
	% of Total	23.1%	10.3%	40.5%	4.6%	21.6%	100.0%	

= Large main effect

= Contrarian cases

Table 4. Sample contrarian case analysis for OSE * KSAOs

4.2.2. Data calibration

The descriptive statistics presented in Appendix C indicated that our data did not exhibit significant skewness, with no absolute skewness values above 2 (Kline, 2023). Based on this assessment and upon careful consideration of the conceptual underpinnings of each variable's scale, we established that the 95/50/5 percentile calibration thresholds were most apt for our data. Subsequently, we transformed our composite variables into fuzzy values encompassing varying degrees of membership ranging from 0 to 1, with thresholds of 95 percent, 50 percent, and 5 percent of the variables for full-set membership, intermediate-set membership, and full-set non-membership, respectively (Pappas and Woodside, 2021). Table 5 details all the calculated thresholds for each variable, which were then employed for data calibration in the fsQCA software.

		FL	IFL	GM	OSE	MGO	KSAOs
N	Valid	546	546	546	546	546	546
	Missing	0	0	0	0	0	0
Percentiles	5 (full membership)	1.7500	3.1111	2.7500	3.7500	4.0000	2.7500
	50 (intermediate membership)	3.0000	4.7778	4.2500	4.8750	5.7500	4.0000
	95 (non-membership)	5.0000	6.6667	5.5000	5.7500	7.0000	5.0000

Table 5. Computed thresholds using 95/50/5 percentiles

4.2.3. fsQCA findings

Upon data calibration, we constructed the truth table, adhering to the stipulated thresholds of three for case inclusion, 0.75 for raw consistency, and close-to-raw consistency for PRI consistency values, as proposed by Pappas and Woodside (2021). Consequently, the Quine-McCluskey algorithm was used to create the complex, parsimonious, and intermediate solutions containing the configurations that led to the outcome of newly acquired KSAOs. In this study, all three solutions converged, yielding an identical set of seven configurations, as shown in Table 6.

	Psychological attributes			Workplace learning		Individual solution			Overall solution	
Configurations	GM	OSE	MGO	FL	IFL	Consistency	Raw coverage	Unique coverage	Consistency	Coverage
KSAOs1	●				●	0.819	0.584	0.012	0.752 (>0.750)	0.829
KSAOs2		●			●	0.839	0.584	0.007		
KSAOs3			●		●	0.820	0.610	0.014		
KSAOs4				●	●	0.807	0.562	0.020		
KSAOs5	●	●	●			0.853	0.540	0.033		
KSAOs6	●	●		●		0.860	0.462	0.008		
KSAOs7		●	●	●		0.865	0.494	0.018		
Note: GM = Growth Mindset; OSE = Occupational self-efficacy; MGO = Mastery Goal Orientation; FL = Formal Learning; IFL = Informal leaning; KSAOs = Knowledge, skills, abilities, and other characteristics; Black circles (●) = presence of a condition; Blank space = "don't care" condition.										

Table 6. fsQCA results

The overall solution coverage can be interpreted similarly to the R^2 statistic in regression-based methods, which, in this case, means that the seven solutions can explain 82.9% or a substantial portion of the KSAOs' outcome. Besides, the overall solution consistency of 0.752 is higher than the threshold of 0.75, indicating adequate results (Pappas and Woodside, 2021).

Upon examining the individual configurations, it is evident that each exhibits a raw coverage score above the threshold of 0.2, thereby affirming their sufficiency in accounting for the outcome (Ragin, 2009). Solutions KSAOs1, KSAOs2, and KSAOs3 illustrate that the KSAOs outcome requires the presence of informal learning and either one of the three psychological attributes. On the other hand, if formal learning is present, solutions KSAOs6 and KSAOs7 dictate that to achieve high KSAOs, there must also be the presence of two psychological attributes simultaneously, either growth mindset and OSE or OSE and MGO, respectively. Additionally, solution KSAOs4 suggests that a combination of formal and informal learning would bring about high KSAOs. Particularly intriguing is the configuration KSAOs5, which posits that the mere existence of all three psychological attributes is sufficient to realise high KSAOs, irrespective of the presence or absence of informal or formal learning. The

consistency value of each solution indicates the strength of the relationship between the conditions and the target outcome. For instance, the consistency score of 0.853 of solution KSAOs5 means that 85.3 percent of the employees with high levels of all three psychological attributes belong to the "high KSAOs" group.

Finally, the solutions in Table 6 were tested for predictive validity to determine how well the model would predict the outcome using different or additional samples (Woodside, 2014). After randomly dividing the original sample into a subsample and a holdout sample, we ran fsQCA analysis for the subsample, which produced eight configurations with good overall solution coverage (0.840) and consistency (0.788) as shown in Appendix D. Of these eight configurations, the five with the highest consistency scores are also the ones similar to the original sample's solutions and were therefore transformed into models using *fuzzyand* functions before being plotted against the KSAOs outcome using the holdout sample. Figure 3 illustrates the XY-plots for the five models, all demonstrating consistency scores above 0.80 and coverage scores from 0.48 to 0.61. These scores, in line with Woodside (2014)'s guideline, not only affirm the high predictive validity of the models but also substantiate their utility in theory advancement.

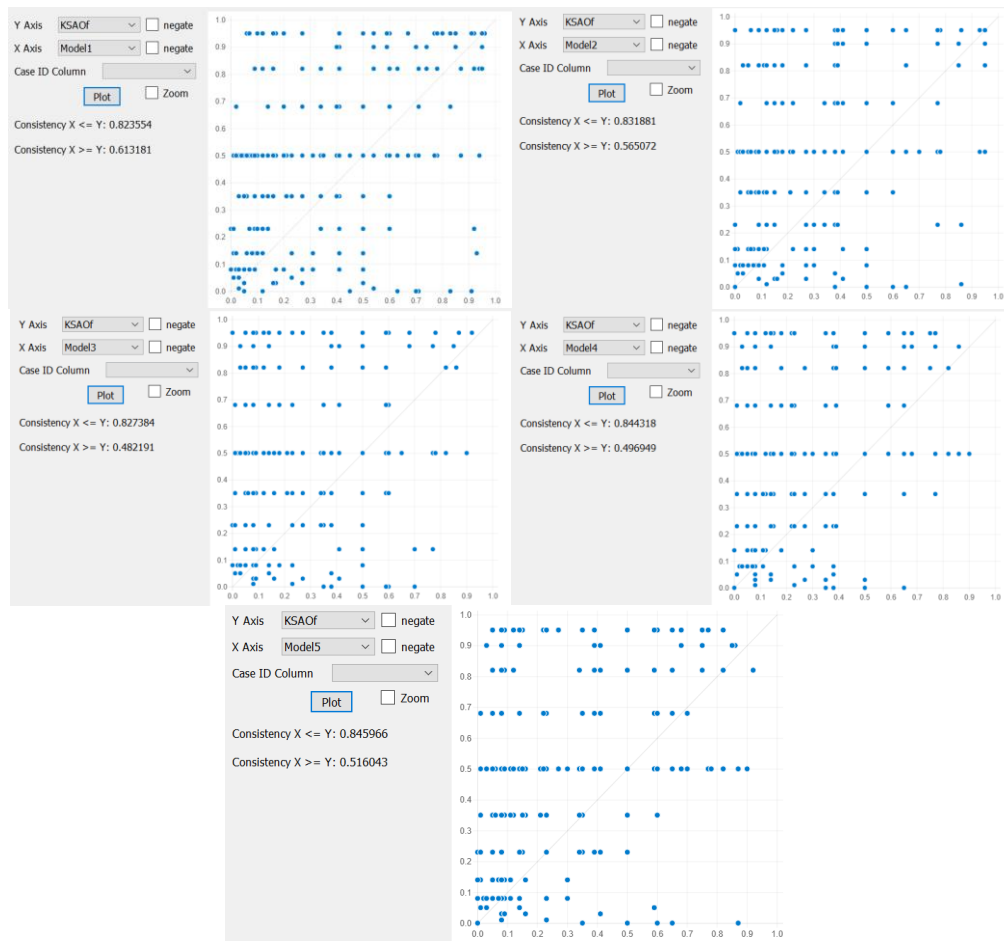


Figure 3. XY-plots for Predictive Validity analysis

5. Discussion and research implications

One of the most intriguing findings from our SEM analysis is that while growth mindset does not directly influence WPL participation and KSAOs, it does so indirectly through the full sequential mediations of OSE and MGO. In other words, a growth mindset's effects must be channelled through cognitive and motivational processes to drive desired learning behaviours. On the one hand, these findings echo the complexity of WPL behaviours as discussed by Kyndt and Baert (2013) and support Rigotti (2009) in recognising the nuanced relationships between psychological attributes and organisational outcomes. On the other hand, the results substantiate the mindset meaning system (MMS) theory (Dweck and Yeager, 2019), demonstrating that a growth mindset fosters its own "meaning system" by entailing allied attributes, which are OSE and MGO in this case, to achieve desired outcomes. Previous studies with contrasting results, such as those of Burgoyne et al. (2020), were often hindered by measurement challenges (Yeager and Dweck, 2020); however, our meticulous approach to measuring these constructs has validated the MMS theory through observed sequential mediations. As a pioneer in examining the growth mindset's impact on WPL, our study also suggests new avenues for applying MMS in the business context, which remains scarce to date.

Moreover, the SEM and fsQCA results jointly underscore the vital role of a growth mindset in KSAOs development. The fsQCA identified a growth mindset as a key factor in three out of seven configurations leading to KSAOs, while SEM revealed an indirect effect of growth mindset on KSAOs via OSE, MGO, and WPL engagement. These indirect effects reinforce the notion that a belief in the growth potential not only catalyses self-efficacy and motivation but also culminates in improved competencies, aligning with Diener and Dweck (1978)'s implicit self-theory and studies validating growth mindset's positive effect on performance metrics (Cutumisu et al., 2018, Keating and Heslin, 2015).

Additionally, both OSE and MGO have also been confirmed as significant predictors of WPL participation and outcomes. Within the fsQCA, OSE and MGO appear in four and three of the seven solutions explaining KSAOs, respectively. SEM analysis also validates these attributes as direct precursors and mediators to both formal and informal WPL, as well as KSAOs. In alignment with existing studies (Maurer et al., 2003, Ong, 2014), such findings further substantiate Bandura (1986)'s social cognitive theory and Dweck and Leggett (1988)'s goal orientation theory, suggesting that employees with a strong belief in their capabilities and a mastery orientation are more likely to engage in ongoing learning activities that facilitate the development of KSAOs. The sequential mediation by these attributes offers a new understanding of how a growth mindset can be translated into improved WPL participation and outcomes.

Significantly, the findings have highlighted the critical role that psychological attributes together play in achieving the objectives of WPL. The fsQCA solution KSAOs5 intriguingly suggests that the combined effect of the three psychological constructs under examination (GM*OSE*MGO) alone could enhance KSAOs, even in the absence of any WPL activities. This finding underscores the potency of the mindset meaning system (Dweck and Yeager, 2019) and illustrates how the synergy of these psychological factors can drive the advancement of knowledge and skills, irrespective of external learning opportunities. Alongside corroborating the mediating effects observed in SEM, the fsQCA results emphasise the dominance of psychological attributes, which can sometimes eclipse the impact of behavioural learning processes in the development of KSAOs.

When considering WPL activities, both SEM and fsQCA analyses suggest that informal WPL is a stronger predictor of KSAOs than formal WPL. SEM analysis shows that the influence of informal learning on KSAOs is more than double that of formal learning. Correspondingly, fsQCA indicates that configurations involving informal learning account for a greater proportion of cases, as evidenced by the higher raw coverage scores of solutions KSAOs1-3 compared to solutions KSAOs6-7. Particularly, it emerges that to attain KSAOs, formal learning must be paired with at least two psychological factors – either a growth mindset and OSE or OSE and MGO, while informal learning necessitates only one accompanying psychological attribute. These findings may be attributed to the ubiquity of informal learning in contemporary workplaces, where it constitutes between 70-90% of all WPL (Noe et al., 2013), and its inherently flexible and responsive nature, often propelled by individual intrinsic motivation and immediate practical needs (Decius et al., 2019).

In sum, the SEM and fsQCA analyses have demonstrated that while the study's independent variables are all crucial for enhancing KSAOs, they are not individually self-sufficient. Rather, it is imperative for the learning activities to be accompanied by employees' positive psychological attributes in boosting their ultimate KSAOs. Instead of arriving at a one-size-fits-all solution, both SEM and fsQCA have uncovered multiple pathways for different psychological attributes and learning experiences to intertwine, leading to acquiring competencies vital for professional development.

5.1.Theoretical implications

Our study's theoretical contributions are fivefold. Firstly, this study introduces a novel conceptual framework that is the first to link a growth mindset to WPL participation and KSAOs directly. By offering new, comprehensive insights into the diverse pathways through which a growth mindset and other psychological attributes can enhance learning behaviours and outcomes, this study deepens our understanding of the underlying psychological and behavioural mechanisms at play in the WPL process.

Secondly, this investigation responds to the calls of scholars such as Park and Lee (2018), Han and Stieha (2020), and Park et al. (2020b) by extending key theories—implicit self-theory, social cognitive theory, and goal orientation theory—to the under-researched context of workplace learning. This extension not only aligns with the scholarly pursuit of examining psychological attributes within Human Resource Development but also serves to narrow the theoretical divide between educational constructs and their practical application in occupational settings. Additionally, this study marks one of the pioneering efforts in affirming the mindset meaning system theory within the realm of business (Yeager and Dweck, 2020).

Thirdly, the research offers novel perspectives by inspecting psychological attributes, particularly a growth mindset, within a non-Western context. Given that the implicit self-theory is likely subject to cultural nuances (Costa and Faria, 2018), our work contributes to the limited body of knowledge on how such attributes function across varied cultural landscapes, specifically addressing the paucity of Eastern cultural viewpoints in this domain (Su et al., 2021).

Fourthly, our study is distinguished by its simultaneous exploration of both formal and informal WPL, an aspect not thoroughly investigated in the existing body of literature

(Grosemans et al., 2020). By including both WPL types, the research casts light on the interplay of their antecedents and effects on KSAOs, uncovering insightful and actionable findings such as the more pronounced impact of informal learning on KSAOs.

Lastly, our research is among the initial attempts to apply both symmetric SEM and asymmetric fsQCA methodologies in examining the influence of psychological traits on WPL. The prevailing research landscape has predominantly focussed on the effects of singular factors through conventional symmetric methodologies like regression analysis, which alone may not fully encapsulate the complexities at hand (Woodside, 2014). By adopting a mixed-methods approach, our study not only increases the robustness of our findings but also broadens the WPL knowledge corpus by exploring the mechanisms leading to enhanced WPL participation and outcomes, as well as the interaction of such precursors in elucidating the targeted results.

5.2. Managerial implications

The empirical findings from our study provide several key insights for organisational leaders and HR practitioners focused on workforce learning and development. Central to these insights is the critical role of a growth mindset in enhancing competencies, urging managers to promote a culture imbued with the ethos of this mindset. This involves nurturing employees' belief in their potential and the positive framing of challenges and setbacks as opportunities for growth.

Furthermore, it is paramount to recognise that a growth mindset is most efficacious when it operates synergistically with OSE and MGO, which have also been identified as potent determinants in facilitating WPL and competency development. Thus, organisations should integrate these psychological attributes into development programs through mentorship, coaching, and feedback mechanisms to foster a comprehensive learning culture.

Additionally, our research delineates the substantial contribution of informal WPL to the development of competencies, often surpassing that of formal WPL. Managers should, therefore, be proactive in fostering a culture of knowledge exchange and peer learning, creating an environment conducive to learning, or endorsing work-relevant Massive Open Online Courses (MOOCs) (Hamori, 2023). Recognising and rewarding employees for their intrinsic motivation to partake in informal learning activities may further potentiate its efficacy. Concurrently, the value of formal learning in competency acquisition should not be disregarded. Managers should endeavour to integrate psychological enhancement strategies within both formal and informal learning initiatives. Given evidence suggesting that growth mindset, self-efficacy, and mastery goal orientation can be nurtured through intervention (Pearson, 2020, Wang et al., 2020), organisations are advised to employ "psychologically wise interventions" (Walton and Wilson, 2018) in the design of training, development programs, and career initiatives to amplify their employees' WPL.

Lastly, the research highlights the need for tailored development approaches that consider individuals' unique psychological and learning profiles. By adopting strategies that align with employees' specific needs and motivations, organisations can engender more effective skill development. Ultimately, by valuing psychological attributes and diverse learning experiences, managers can drive competency growth and organisational success in a dynamic business landscape.

5.3. Limitations and future research directions

The cross-sectional design used in this study does not allow for causal inferences among these constructs (Maxwell and Cole, 2007). Instead, the study lays the correlative groundwork for future longitudinal research (Spector, 2019) to explore the development and causal influence of psychological attributes on WPL behaviours and outcomes. Besides, the reliance on self-reported data for both antecedents and outcomes may introduce biases despite our diligent efforts to control them (Karpen, 2018). Future research could improve reliability by including objective assessments of learning outcomes from external sources such as managers or supervisors.

6. Conclusion

Our study adopts a SEM-fsQCA hybrid methodology to explore the complex interplay between psychological attributes, WPL behaviours, and KSAOs. Supporting our conceptual framework, SEM underscores the importance of psychological attributes, i.e., growth mindset, OSE, and MGO, in enhancing WPL participation and competency development. Noteworthy is the identification of several sequential mediation pathways, illustrating how a growth mindset propagates through these attributes to form a "mindset meaning system," which, in turn, bolsters participation in WPL and consequently boosts KSAOs. On the other hand, fsQCA introduces a nuanced perspective, unveiling contrarian cases and diverse pathways to achieving high KSAOs. Despite their diversity, the fsQCA outcomes converge on the importance of combining positive psychological attributes with learning endeavours to develop KSAOs, highlighting the particular efficacy of informal WPL in this process. These insights underscore the intricacies of psychological mechanisms within organisations' human development, suggesting that a variety of psychological attributes and learning experiences can lead to favourable learning outcomes. This diversity emphasises the importance of tailored interventions in nurturing employee growth. Given the imperativeness of workplace learning nowadays, this study makes an important contribution by offering a holistic perspective on how psychological attributes interweave with learning processes to foster competencies essential for professional advancement, paving the way for both future research and practical application in the workplace.

APPENDIX A – Specific bias tests

	X ²	DF	Delta	p-value
Zero Constraints Test				
Unconstrained model	988.094	423	X2=228.300 DF=27	0.000
Zero constrained model	1216.394	450		
Equal Constraints Test				
Unconstrained model	988.094	423	X ² =84.431 DF=26	0.000
Equal constrained model	1072.525	449		

APPENDIX B – Contrarian case matrices

			Percentile Group of KSAOs					Total
			1	2	3	4	5	
Percentile Group of Growth Mindset (GM)	1	Count	34	15	43	6	19	117
		% of Total	6.2%	2.7%	7.9%	1.1%	3.5%	21.4%
	2	Count	44	16	61	3	21	145
		% of Total	8.1%	2.9%	11.2%	0.5%	3.8%	26.6%
	3	Count	11	8	25	2	11	57
		% of Total	2.0%	1.5%	4.6%	0.4%	2.0%	10.4%
	4	Count	23	7	49	8	22	109
		% of Total	4.2%	1.3%	9.0%	1.5%	4.0%	20.0%
	5	Count	14	10	43	6	45	118
		% of Total	2.6%	1.8%	7.9%	1.1%	8.2%	21.6%
Total		Count	126	56	221	25	118	546
		% of Total	23.1%	10.3%	40.5%	4.6%	21.6%	100.0%

			Percentile Group of KSAOs					Total
			1	2	3	4	5	
Percentile Group of Mastery Goal Orientation (MGO)	1	Count	46	14	26	1	14	101
		% of Total	8.4%	2.6%	4.8%	0.2%	2.6%	18.5%
	2	Count	26	12	50	5	23	116
		% of Total	4.8%	2.2%	9.2%	0.9%	4.2%	21.2%
	3	Count	13	7	31	2	10	63
		% of Total	2.4%	1.3%	5.7%	0.4%	1.8%	11.5%
	4	Count	30	14	91	8	28	171
		% of Total	5.5%	2.6%	16.7%	1.5%	5.1%	31.3%
	5	Count	11	9	23	9	43	95
		% of Total	2.0%	1.6%	4.2%	1.6%	7.9%	17.4%
Total		Count	126	56	221	25	118	546
		% of Total	23.1%	10.3%	40.5%	4.6%	21.6%	100.0%

			Percentile Group of KSAOs					Total
			1	2	3	4	5	
Percentile Group of Formal Learning (FL)	1	Count	37	16	33	6	16	108
		% of Total	6.8%	2.9%	6.0%	1.1%	2.9%	19.8%
	2	Count	32	10	35	4	12	93
		% of Total	5.9%	1.8%	6.4%	0.7%	2.2%	17.0%
	3	Count	21	11	50	4	21	107
		% of Total	3.8%	2.0%	9.2%	0.7%	3.8%	19.6%
	4	Count	24	15	48	4	35	126
		% of Total	4.4%	2.7%	8.8%	0.7%	6.4%	23.1%
	5	Count	12	4	55	7	34	112
		% of Total	2.2%	0.7%	10.1%	1.3%	6.2%	20.5%
Total		Count	126	56	221	25	118	546
		% of Total	23.1%	10.3%	40.5%	4.6%	21.6%	100.0%

			Percentile Group of KSAOs					Total
			1	2	3	4	5	
Percentile Group of Informal Learning (IFL)	1	Count	40	15	47	2	8	112
		% of Total	7.3%	2.7%	8.6%	0.4%	1.5%	20.5%
	2	Count	38	13	47	2	7	107
		% of Total	7.0%	2.4%	8.6%	0.4%	1.3%	19.6%
	3	Count	21	13	44	8	20	106
		% of Total	3.8%	2.4%	8.1%	1.5%	3.7%	19.4%
	4	Count	15	6	42	9	32	104
		% of Total	2.7%	1.1%	7.7%	1.6%	5.9%	19.0%
	5	Count	12	9	41	4	51	117
		% of Total	2.2%	1.6%	7.5%	0.7%	9.3%	21.4%
Total		Count	126	56	221	25	118	546
		% of Total	23.1%	10.3%	40.5%	4.6%	21.6%	100.0%

= Large main effect

= Contrarian cases

= Large main effect
 = Contrarian cases

APPENDIX C – Descriptive statistics

	N Statistic	Minimum Statistic	Maximum Statistic	Mean Statistic	Std. Deviation Statistic	Skewness		Kurtosis	
						Statistic	Std. Error	Statistic	Std. Error
FL	546	1.00	7.00	3.0755	1.03788	.636	.105	.349	.209
IFL	546	1.00	7.00	4.8315	1.10348	-.093	.105	-.553	.209
GM	546	1.00	6.00	4.1772	.84462	-.548	.105	.814	.209
OSE	546	2.13	6.00	4.7727	.61753	-.451	.105	.703	.209
MGO	546	1.00	7.00	5.6566	.84727	-.836	.105	1.770	.209
KSAO	546	1.00	5.00	3.9194	.73238	-1.233	.105	3.491	.209

APPENDIX D – Subsample's fsQCA results

Model: $KSAof = f(GMf, OSEf, MGof, FLf, IFLf)$

Algorithm: Quine-McCluskey

--- INTERMEDIATE SOLUTION ---

frequency cutoff: 2

consistency cutoff: 0.880926

Assumptions:

	raw coverage	unique coverage	consistency
~MGof*IFLf	0.494579	0.0308328	0.848592
GMf*IFLf	0.554224	0.0131448	0.852506
OSEf*IFLf	0.550805	0.012947	0.85757
FLf*IFLf	0.55316	0.0217455	0.826058
GMf*OSEf*MGof	0.511675	0.0354828	0.879806
GMf*OSEf*FLf	0.439417	0.00699025	0.900503
GMf*MGof*FLf	0.455373	0.0100295	0.890892
OSEf*MGof*FLf	0.469961	0.015348	0.888271
solution coverage:	0.839591		
solution consistency:	0.787633		

References

- ALHADABI, A. & KARPINSKI, A. C. 2019. Grit, self-efficacy, achievement orientation goals, and academic performance in University students. *International Journal of Adolescence and Youth*, 25, 519-535.
- AMIN, M. & ISLAM, A. 2014. Are there more female managers in the retail sector? Evidence from survey data in developing countries. *Journal of Applied Economics*, 17, 213-228.
- BANDURA, A. 1986. The explanatory and predictive scope of self-efficacy theory. *Journal of social and clinical psychology*, 4, 359-373.
- BANDURA, A. 1997. *Self-efficacy: The exercise of control*, New York, NY, US, W H Freeman/Times Books/ Henry Holt & Co.
- BARANIK, L. E., BARRON, K. E. & FINNEY, S. J. 2007. Measuring goal orientation in a work domain: Construct validity evidence for the 2×2 framework. *Educational and Psychological Measurement*, 67, 697-718.
- BARBER, W., VAN OOSTVEEN, R. & CHILDS, E. Situating resilience, grit and growth mindset as constructs of social presence in the fully online learning community model (FOLC). Proceedings of the 18th European Conference on e - Learning, 2019. 65.
- BAZELAIS, P., LEMAY, D. J., DOLECK, T., HU, X. S., VU, A. & YAO, J. 2018. Grit, mindset, and academic performance: A study of pre-university science students. *EURASIA Journal of Mathematics, Science and Technology Education*, 14, em1615.
- BEATON, D. E., BOMBARDIER, C., GUILLEMIN, F. & FERRAZ, M. B. 2000. Guidelines for the process of cross-cultural adaptation of self-report measures. *Spine*, 25, 3186-3191.

- BRETT, J. F. & VANDEWALLE, D. 1999. Goal orientation and goal content as predictors of performance in a training program. *Journal of applied psychology*, 84, 863.
- BURGOYNE, A. P., HAMBRICK, D. Z. & MACNAMARA, B. N. 2020. How firm are the foundations of mindset theory? The claims appear stronger than the evidence. *Psychological Science*, 31, 258-267.
- BURNETTE, J. L., O'BOYLE, E. H., VANEPPS, E. M., POLLACK, J. M. & FINKEL, E. J. 2013. Mindsets matter: a meta-analytic review of implicit theories and self-regulation. *Psychological bulletin*, 139, 655.
- CARLISLE, J., BHANUGOPAN, R. & D'NETTO, B. 2019. Enhancing task performance through effective training: The mediating role of work environment and moderating effect of non-mandatory training. *Journal of Business Research*, 104, 340-349.
- CARLSON, N. R. 1993. *Psychology: The science of behavior*, Boston, Allyn and Bacon.
- CHEN, G., GULLY, S. M. & EDEN, D. 2001. Validation of a New General Self-Efficacy Scale. *Organisational Research Methods*, 4, 62-83.
- COOPER, B., EVA, N., FAZLELAHI, F. Z., NEWMAN, A., LEE, A. & OBSCHONKA, M. 2020. Addressing common method variance and endogeneity in vocational behavior research: A review of the literature and suggestions for future research. *Journal of Vocational Behavior*, 121, 103472.
- COSTA, A. & FARIA, L. 2018. Implicit Theories of Intelligence and Academic Achievement: A Meta-Analytic Review. *Frontiers in Psychology*, 9, 829.
- CUTUMISU, M., BROWN, M. R. G., FRAY, C. & SCHMÖLZER, G. M. 2018. Growth Mindset Moderates the Effect of the Neonatal Resuscitation Program on Performance in a Computer-Based Game Training Simulation. *Frontiers in Pediatrics*, 6, 195.
- D'ARCY, J., HERATH, T. & SHOSS, M. K. 2014. Understanding employee responses to stressful information security requirements: A coping perspective. *Journal of management information systems*, 31, 285-318.
- DECIUS, J., SCHAPER, N. & SEIFERT, A. 2019. Informal workplace learning: Development and validation of a measure. *Human Resource Development Quarterly*, 30, 495-535.
- DECIUS, J., SCHAPER, N. & SEIFERT, A. 2021. Work Characteristics or Workers' Characteristics? An Input-Process-Output Perspective on Informal Workplace Learning of Blue-Collar Workers. *Vocations and Learning*, 14, 285-326.
- DIENER, C. I. & DWECK, C. S. 1978. An analysis of learned helplessness: Continuous changes in performance, strategy, and achievement cognitions following failure. *Journal of personality and social psychology*, 36, 451.
- DIENER, C. I. & DWECK, C. S. 1980. An analysis of learned helplessness: II. The processing of success. *Journal of personality and social psychology*, 39, 940.
- DOORNBOS, A. J., SIMONS, R. J. & DENESSEN, E. 2008. Relations between characteristics of workplace practices and types of informal work - related learning: A survey study among Dutch Police. *Human Resource Development Quarterly*, 19, 129-151.
- DWECK, C. S. 1999. *Self-theories: Their role in motivation, personality, and development*, Psychology press.
- DWECK, C. S. 2006. *Mindset: The new psychology of success*, Random house.
- DWECK, C. S. & LEGGETT, E. L. 1988. A social-cognitive approach to motivation and personality. *Psychological review*, 95, 256.
- DWECK, C. S. & REPPUCCI, N. D. 1973. Learned helplessness and reinforcement responsibility in children. *Journal of personality and social psychology*, 25, 109.
- DWECK, C. S. & YEAGER, D. S. 2019. Mindsets: A view from two eras. *Perspectives on Psychological science*, 14, 481-496.
- ELLIOTT, E. S. & DWECK, C. S. 1988. Goals: An approach to motivation and achievement. *Journal of personality and social psychology*, 54, 5.

- FISS, P. C. 2011. Building better causal theories: A fuzzy set approach to typologies in organisation research. *Academy of management journal*, 54, 393-420.
- GAGNE, R. M. 1984. Learning outcomes and their effects: Useful categories of human performance. *American psychologist*, 39, 377.
- GARAVAN, T. N., CARBERY, R., O'MALLEY, G. & O'DONNELL, D. 2010. Understanding participation in e - learning in organisations: a large - scale empirical study of employees. *International Journal of Training and Development*, 14, 155-168.
- GROSEMANS, I., SMET, K., HOUBEN, E., CUYPER, N. D. & KYNDT, E. 2020. Development and Validation of an Instrument to Measure Work-Related Learning. *Scandinavian Journal of Work and Organizational Psychology*, 5.
- GUNDERSON, E. A., SORHAGEN, N. S., GRIPSHOVER, S. J., DWECK, C. S., GOLDIN-MEADOW, S. & LEVINE, S. C. 2018. Parent praise to toddlers predicts fourth grade academic achievement via children's incremental mindsets. *Developmental psychology*, 54, 397.
- HAMORI, M. 2023. Self-directed learning in massive open online courses and its application at the workplace: Does employer support matter? *Journal of Business Research*, 157, 113590.
- HAN, S. J. & STIEHA, V. 2020. Growth Mindset for Human Resource Development: A Scoping Review of the Literature with Recommended Interventions. *Human Resource Development Review*, 19, 309-331.
- HAYES, A. F. 2017. *Introduction to mediation, moderation, and conditional process analysis: A regression-based approach*, Guilford publications.
- HECKMAN, J. J. & KAUTZ, T. 2014. Achievement tests and the role of character in American life. The Myth of Achievement Tests: The GED and the Role of Character in American
- HONICKE, T. & BROADBENT, J. 2016. The influence of academic self-efficacy on academic performance: A systematic review. *Educational research review*, 17, 63-84.
- HSIEH, P., SULLIVAN, J. R. & GUERRA, N. S. 2007. A closer look at college students: Self-efficacy and goal orientation. *Journal of advanced academics*, 18, 454-476.
- HU, L. T. & BENTLER, P. M. 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural equation modeling: a multidisciplinary journal*, 6, 1-55.
- HÜTHER, G. 2016. Brainwash—Innovation starts in the mind. *Developing Leaders*, 23, 38-42.
- JUDGE, T. A. & BONO, J. E. 2001. Relationship of core self-evaluations traits—self-esteem, generalised self-efficacy, locus of control, and emotional stability—with job satisfaction and job performance: A meta-analysis. *Journal of applied Psychology*, 86, 80.
- KAMTSIOS, S. & KARAGIANNOPOULOU, E. 2013. Conceptualising students' academic hardiness dimensions: A qualitative study. *European journal of psychology of education*, 28, 807-823.
- KARPEN, S. C. 2018. The social psychology of biased self-assessment. *American Journal of Pharmaceutical Education*, 82.
- KEATING, L. A. & HESLIN, P. A. 2015. The potential role of mindsets in unleashing employee engagement. *Human Resource Management Review*, 25, 329-341.
- KLINE, R. B. 2023. *Principles and practice of structural equation modeling*, New York, Guilford publications.
- KOCHANSKI, J. T. 1996. Introduction to special issue on human resource competencies. *Human Resource Management (1986-1998)*, 35, 3.
- KOPP, T., KINKEL, S., SCHÄFER, T., KIESLINGER, B. & BROWN, A. J. 2020. Measuring the impact of learning at the workplace on organisational performance. *International Journal of Productivity and Performance Management*, 69, 1455-1474.
- KRAIGER, K., FORD, J. K. & SALAS, E. 1993. Application of cognitive, skill-based, and affective theories of learning outcomes to new methods of training evaluation. *Journal of applied psychology*, 78, 311.

- KYNDT, E. & BAERT, H. 2013. Antecedents of Employees' Involvement in Work-Related Learning: A Systematic Review. *Review of Educational Research*, 83, 273-313.
- LARSEN, P. G., KRISTIANSEN, E. L., BENNEDSEN, J. & BJERGE, K. 2017. Enhancing non-technical skills by a multidisciplinary engineering summer school. *European Journal of Engineering Education*, 42, 1076-1096.
- LE, T. T. 2020. Factors affecting labour productivity of employee in an Asian emerging market: evidence in Vietnamese retail sector. *International Journal of Business and Globalisation*, 24, 513-528.
- LI, Y. & BATES, T. C. 2019. You can't change your basic ability, but you work at things, and that's how we get hard things done: Testing the role of growth mindset on response to setbacks, educational attainment, and cognitive ability. *Journal of Experimental Psychology: General*, 148, 1640.
- LI, Y. & BATES, T. C. 2020. Testing the association of growth mindset and grades across a challenging transition: Is growth mindset associated with grades? *Intelligence*, 81.
- LU, C.-M., CHEN, S.-J., HUANG, P.-C. & CHIEN, J.-C. 2015. Effect of diversity on human resource management and organisational performance. *Journal of Business Research*, 68, 857-861.
- LYONS, P. & BANDURA, R. 2018. The intersection of mindsets and self-regulated learning. *Development and Learning in Organisations: An International Journal*, 32, 1-4.
- LYONS, P. & BANDURA, R. 2020. Employee learning stimulated by manager-as-coach. *Journal of Workplace Learning*, 32, 627-640.
- MACKENZIE, S. B. & PODSAKOFF, P. M. 2012. Common method bias in marketing: Causes, mechanisms, and procedural remedies. *Journal of retailing*, 88, 542-555.
- MATTHEWS, P. 1999. Workplace learning: Developing an holistic model. *The learning organisation*, 6, 18-29.
- MAURER, T. J., MITCHELL, D. R. & BARBEITE, F. G. 2002. Predictors of attitudes toward a 360 - degree feedback system and involvement in post - feedback management development activity. *Journal of Occupational and Organizational Psychology*, 75, 87-107.
- MAURER, T. J., WEISS, E. M. & BARBEITE, F. G. 2003. A model of involvement in work-related learning and development activity: the effects of individual, situational, motivational, and age variables. *J Appl Psychol*, 88, 707-24.
- MAXWELL, S. E. & COLE, D. A. 2007. Bias in cross-sectional analyses of longitudinal mediation. *Psychological methods*, 12, 23.
- MIELE, D. B. & MOLDEN, D. C. 2010. Naive theories of intelligence and the role of processing fluency in perceived comprehension. *Journal of Experimental Psychology: General*, 139, 535.
- NEWMAN, A., HERMAN, H., SCHWARZ, G. & NIELSEN, I. 2018. The effects of employees' creative self-efficacy on innovative behavior: The role of entrepreneurial leadership. *Journal of business research*, 89, 1-9.
- NGUYEN, P.-H., TSAI, J.-F., NGUYEN, V.-T., VU, D.-D. & DAO, T.-K. 2020. A decision support model for financial performance evaluation of listed companies in the Vietnamese retailing industry. *the journal of Asian finance, economics and business*, 7, 1005-1015.
- NGUYEN, S. P. 2021. Deep customer segmentation with applications to a Vietnamese supermarkets' data. *Soft Computing*, 25, 7785-7793.
- NICHOLLS, J. G. 1984. Achievement motivation: Conceptions of ability, subjective experience, task choice, and performance. *Psychological review*, 91, 328.
- NIKOLOVA, I., VAN RUYSEVELDT, J., DE WITTE, H. & SYROIT, J. 2014. Well-being in times of task restructuring: The buffering potential of workplace learning. *Work & Stress*, 28, 217-235.
- NOE, R. A., CLARKE, A. D. M. & KLEIN, H. J. 2014. Learning in the Twenty-First-Century Workplace. *Annual Review of Organizational Psychology and Organizational Behavior*, 1, 245-275.
- NOE, R. A., TEWS, M. J. & MARAND, A. D. 2013. Individual differences and informal learning in the workplace. *Journal of Vocational Behavior*, 83, 327-335.

- ONG, C. H. 2014. Goal Orientation of Adult Students Towards Learning Strategies: The Malaysian Context. *Psychological Thought*, 7, 156-167.
- ÖZDURAN, A. & TANOVA, C. 2017. Manager mindsets and employee organisational citizenship behaviours. *International Journal of Contemporary Hospitality Management*, 29, 589-606.
- OZILI, P. K. 2023. The acceptable R-square in empirical modelling for social science research. *Social research methodology and publishing results: A guide to non-native english speakers*. IGI Global.
- PAJARES, F., BRITNER, S. L. & VALIANTE, G. 2000. Relation between achievement goals and self-beliefs of middle school students in writing and science. *Contemporary educational psychology*, 25, 406-422.
- PAPPAS, I. O. & WOODSIDE, A. G. 2021. Fuzzy-set Qualitative Comparative Analysis (fsQCA): Guidelines for research practice in Information Systems and marketing. *International Journal of Information Management*, 58, 102310.
- PARK, D., TSUKAYAMA, E., YU, A. & DUCKWORTH, A. L. 2020a. The development of grit and growth mindset during adolescence. *J Exp Child Psychol*, 198, 104889.
- PARK, S. & LEE, J. Y. 2018. Workplace learning measures for human resource development: review and summary. *Industrial and Commercial Training*, 50, 420-431.
- PARK, Y., WOO, H., OH, M.-R. & PARK, S. 2020b. The role and related variables of workplace learning in quantitative research. *Industrial and Commercial Training*, 53, 29-59.
- PAYNE, S. C., YOUNGCOURT, S. S. & BEAUBIEN, J. M. 2007. A meta-analytic examination of the goal orientation nomological net. *Journal of applied psychology*, 92, 128.
- PEARSON, J. 2020. Engaging a Belief in Learning Styles to Encourage a Growth Mindset. *Performance Improvement*, 59, 19-24.
- PODSAKOFF, P. M., MACKENZIE, S. B., LEE, J.-Y. & PODSAKOFF, N. P. 2003. Common method biases in behavioral research: a critical review of the literature and recommended remedies. *Journal of applied psychology*, 88, 879.
- PUENTE-DÍAZ, R. & CAVAZOS-ARROYO, J. 2017. The influence of creative mindsets on achievement goals, enjoyment, creative self-efficacy and performance among business students. *Thinking Skills and Creativity*, 24, 1-11.
- RAGIN, C. C. 2009. *Redesigning social inquiry: Fuzzy sets and beyond*, University of Chicago Press.
- RAGIN, C. C. & DAVEY, S. 2016. *Fuzzy-Set/Qualitative Comparative Analysis*. Irvine, California: Department of Sociology, University of California.
- REN, S. & CHADEE, D. 2017. Ethical leadership, self-efficacy and job satisfaction in China: the moderating role of guanxi. *Personnel review*, 46, 371-388.
- RIGOTTI, T. 2009. Enough is enough? Threshold models for the relationship between psychological contract breach and job-related attitudes. *European Journal of work and organisational psychology*, 18, 442-463.
- RUSSELL, D. & WARNER, R. 2017. Motivational intermediaries of self-regulation among university students. *Journal of Applied Research in Higher Education*, 9, 448-464.
- SAMUEL, T. S. & WARNER, J. 2019. "I Can Math!": Reducing Math Anxiety and Increasing Math Self-Efficacy Using a Mindfulness and Growth Mindset-Based Intervention in First-Year Students. *Community College Journal of Research and Practice*, 45, 205-222.
- SCHNELL, K., RINGEISEN, T., RAUFELDER, D. & ROHRMANN, S. 2015. The impact of adolescents' self-efficacy and self-regulated goal attainment processes on school performance—Do gender and test anxiety matter? *Learning and Individual Differences*, 38, 90-98.
- SCHYNS, B. & VON COLLANI, G. 2002. A new occupational self-efficacy scale and its relation to personality constructs and organisational variables. *European Journal of Work and Organizational Psychology*, 11, 219-241.
- SHANG, D. & WU, W. 2019. Employee's ubiquitous learning engagement: Impact of innovativeness-oriented learning system design factors and the mediating role of imagery. *Telematics and Informatics*, 41, 156-167.

- SHAPCOTT, S. & CARR, S. 2020. Golf coaches' mindsets about recreational golfers: Gendered golf experiences start on the practice tee. *Motivation Science*, 6, 275-284.
- SPECTOR, P. E. 2019. Do not cross me: Optimising the use of cross-sectional designs. *Journal of Business and Psychology*, 34, 125-137.
- STIRIN, K., GANZACH, Y., PAZY, A. & EDEN, D. 2012. The effect of perceived advantage and disadvantage on performance: The role of external efficacy. *Applied Psychology*, 61, 81-96.
- SU, A., WAN, S., HE, W. & DONG, L. 2021. Effect of Intelligence Mindsets on Math Achievement for Chinese Primary School Students: Math Self-Efficacy and Failure Beliefs as Mediators. *Front Psychol*, 12, 640349.
- SUBRAMONY, M., SEGERS, J., CHADWICK, C. & SHYAMSUNDER, A. 2018. Leadership development practice bundles and organisational performance: The mediating role of human capital and social capital. *Journal of business research*, 83, 120-129.
- TABERNERO, C. & WOOD, R. E. 1999. Implicit theories versus the social construal of ability in self-regulation and performance on a complex task. *Organisational behavior and human decision processes*, 78, 104-127.
- TAGGAR, S. & SEIJTS, G. H. 2003. Leader and staff role-efficacy as antecedents of collective-efficacy and team performance. *Human Performance*, 16, 131-156.
- TAVERNIERS, J. 2011. *Learning reduces stress? Stress inhibits learning? It depends: Occupational research combining survey studies, field experiments, and cortisol assessments*, Open Universiteit Heerlen.
- TYNJÄLÄ, P. 2013. Toward a 3-P Model of Workplace Learning: a Literature Review. *Vocations and Learning*, 6, 11-36.
- VANCOUVER, J. B. & MORRISON, E. W. 1995. Feedback inquiry: The effect of source attributes and individual differences. *Organisational Behavior and Human Decision Processes*, 62, 276-285.
- VANDEWALLE, D. 2003. A goal orientation model of feedback-seeking behavior. *Human resource management review*, 13, 581-604.
- VANDEWALLE, D. & CUMMINGS, L. L. 1997. A test of the influence of goal orientation on the feedback-seeking process. *Journal of applied psychology*, 82, 390.
- WALTON, G. M. & WILSON, T. D. 2018. Wise interventions: Psychological remedies for social and personal problems. *Psychological review*, 125, 617.
- WANG, D., YUAN, F. & WANG, Y. 2020. Growth mindset and academic achievement in Chinese adolescents: A moderated mediation model of reasoning ability and self-affirmation. *Current Psychology*, 1-10.
- WEINER, B. 1985. An attributional theory of achievement motivation and emotion. *Psychological review*, 92, 548.
- WEINERT, F. E. 2001. Vergleichende leistungsmessung in schulen-eine umstrittene Selbstverständlichkeit. *Leistungsmessungen in schulen*. Beltz.
- WIELENGA-MEIJER, E. G., TARIS, T. W., KOMPIER, M. A. & WIGBOLDUS, D. H. 2010. From task characteristics to learning: A systematic review. *Scandinavian journal of psychology*, 51, 363-375.
- WOOD, R. & BANDURA, A. 1989. Social cognitive theory of organisational management. *Academy of management Review*, 14, 361-384.
- WOODSIDE, A. G. 2014. Embrace• perform• model: Complexity theory, contrarian case analysis, and multiple realities. *Journal of Business Research*, 67, 2495-2503.
- YEAGER, D. S. & DWECK, C. S. 2020. What can be learned from growth mindset controversies? *Am Psychol*, 75, 1269-1284.
- YEAGER, D. S., HANSELMAN, P., WALTON, G. M., MURRAY, J. S., CROSNOE, R., MULLER, C., TIPTON, E., SCHNEIDER, B., HULLEMAN, C. S., HINOJOSA, C. P., PAUNESKU, D., ROMERO, C., FLINT, K., ROBERTS, A., TROTT, J., IACHAN, R., BUONTEMPO, J., YANG, S. M., CARVALHO, C. M., HAHN, P. R., GOPALAN, M., MHATRE, P., FERGUSON, R.,

- DUCKWORTH, A. L. & DWECK, C. S. 2019. A national experiment reveals where a growth mindset improves achievement. *Nature (London)*, 573, 364-369.
- ZHAO, H., ZHANG, J., HENG, S. & QI, C. 2021. Team growth mindset and team scientific creativity of college students: The role of team achievement goal orientation and leader behavioral feedback. *Thinking Skills and Creativity*, 42.
- ZIMMERMAN, B. J. 2000. Self-efficacy: An essential motive to learn. *Contemporary educational psychology*, 25, 82-91.
- ZIMMERMAN, B. J. & CAMPILLO, M. 2003. Motivating self-regulated problem solvers. *The psychology of problem solving*, 233-262.